

## EXTERNAL SEX CHARACTERS OF TWO IMPORTANT NATIVE PREDATORS OF THE MOUNTAIN PINE BEETLE IN SUGAR PINE

(Coleoptera: Ostomatidæ, Cleridæ)

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### INTRODUCTION

The green trogositid, *Temnochila virescens* (F.) var. *chlorodia* Mann. (Ostomatidæ), and the red-bellied clerid, *Enoclerus spegeus* F. (Cleridæ), are the most important insect enemies of the mountain pine beetle (*Dendroctonus monticolæ* Hopk.) in sugar pine. Both these beetles are consistently associated with *Dendroctonus* infestations, but neither of them ever occurs in numbers sufficient to check the development and spread of outbreaks of the mountain pine beetle.

In biological studies pertaining to the two species, a handicap was found in setting up mating pairs for oviposition, owing to an apparent lack of any differentiating external sexual character by which the males and females could be segregated. This was partially overcome by placing a number of adults of a given species in a container and later separating out pairs inclined to mate. While this method was rather successful, the adults often resorted to fighting which resulted in injury or death. This factor, in addition to the time required in making a proper setup, emphasized more than ever the need for the discovery of a constant sexual character by which the adults could be separated. Furthermore, the segregation of sexes on the basis of mating behavior often resulted in pairs of the same sex.

### METHODS

In the search for a character or characters, each species was studied assiduously under the binocular microscope. Characters commonly used by coleopterists to differentiate between sexes were examined. First consideration was given to differences which might be found in number and relative size of antennal segments, size and number of tarsal segments, differences in punctuation and striation, and differences in external genitalia. To facilitate these observations, microscope glass slides were especially prepared of appendages, genitalia, and exoskeletons from both sexes.

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## DESCRIPTION OF SEX CHARACTERS

These studies resulted in the discovery of a character for each species of predator which is constant and fairly easy to distinguish with the aid of an 8X hand lens or low-power binocular microscope. Detailed illustrations of the character for each species are presented in Figures 1 and 2.

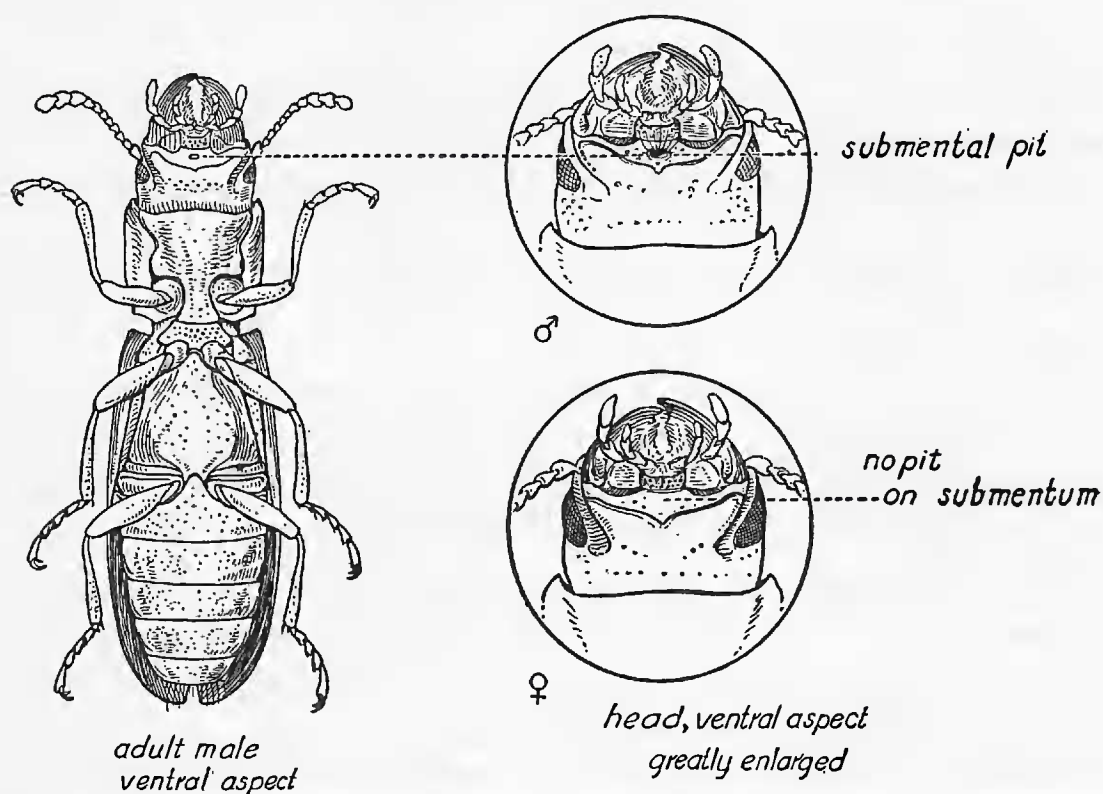


Figure 1. *Temnochila virescens chlorodia* (Mann.), showing difference between sexes.

## TEMNOCHILA VIRESCENS (Fabr.)

On the broad central area of the submentum of the male there is a median pit<sup>1</sup> containing a group of hairs. This sclerite is fairly broad medially, with lateral extensions narrow. Both pit and submentum are sufficiently large to be seen under an 8X hand lens. Examinations of the genitalia of five individuals with the submental pit and five without it indicated that those beetles possessing the pit were definitely males, while those lacking the pit were females.

It was thus fairly clear that the male could be differentiated from the female by this character. In order to substantiate this

<sup>1</sup>This pit has not been referred to in the literature in describing the genus or species. (See References.)

belief without further dissection the following observations were made:

(1) Four mated pairs, which had been the most productive egg layers in the laboratory, were examined, and in each case found to contain one individual with and one without the submental pit. Observations of mating behavior indicated that the male possessed the character.

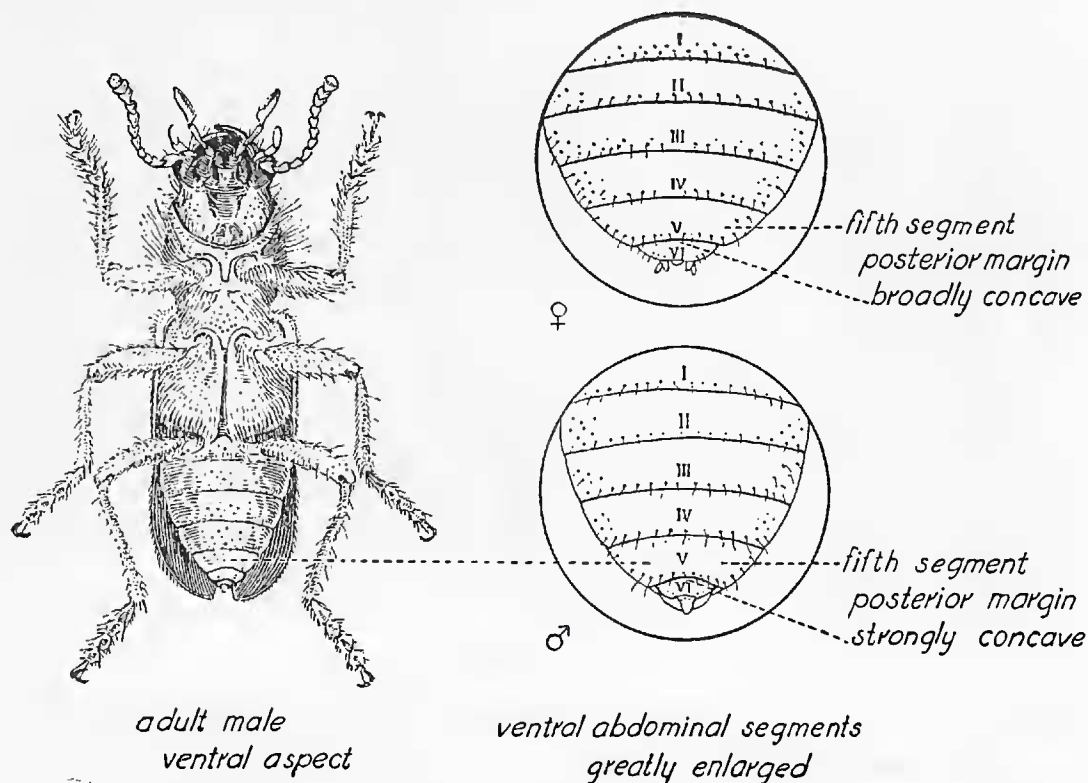


Figure 2. *Enoclerus sphegeus* (Fabr.), showing difference between sexes.

(2) A similar condition existed in eight of ten pairs set up on the basis of mating behavior. In the other two pairs of this group, both the individuals had the pit, *i.e.*, both were males. This is the situation mentioned previously, whereby as a result of mating behavior, pairs of beetles are often mismated.

(3) On the basis of presence or absence of the pit, forty-six individuals were segregated into two homogeneous groups. Mating was not observed within either of these groups, thus indicating that the sexes had been properly separated. When the groups were combined so that equal sex distribution was obtained, mating was observed immediately. A careful examination of each mated pair showed the presence of the submental pit in the male and the total absence of this structure in the female.

## ENOCLERUS SPHEGEUS (Fabr.)

The only constant sexual character found on this species is in the fifth (penultimate) abdominal sternite. In the male the posterior margin of this sternite is definitely concave. In the female the curve is not so pronounced. This character can be used successfully and accurately after some experience.

In alcoholic or mounted specimens the character is sufficiently good to allow perfect accuracy (as checked by examination of genitalia) in determining differences between sexes. In the living individual, examined under a hand lens or dissecting microscope, observation of this character is made difficult by the great activity of this species. The insect also has the habit of curling up the abdomen, and as a consequence the penultimate sternite is difficult to observe carefully.

The use of an anesthetic to quiet the beetles, or of refrigeration to slow them down, would make the determination fairly easy. While this character is constant, it is complicated by the behavior of the active beetle, and had best be regarded as a temporary aid in distinguishing the sexes.

## REFERENCES

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Olivier, A. G. 1790. *Entomologie*, 2; No. 19, 8. (*Trogosita virescens* Fabr.)  
Westwood, J. O. 1835. *Zoological Journal*, 5:231. (*Temnochila* Westw.)
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## A NEW SPECIES OF ELEODES FROM OREGON, BELONGING TO THE SUBGENUS BLAPYLIS

(Coleoptera, Tenebrionidæ)

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The author has recently received a series of a species of *Eleodes* which belongs to the subgenus *Blapylis*. This species apparently inhabits a limited geographical area in Oregon.